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SOVIET AND WEST EUROPEAN STRATEGIES REGARDING THE PIPELINE

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Key Judgments

In response to the expanded US embargo, the Soviets will formulate a common sense, business-as-usual strategy. They will stress:

- o The mutual benefits of East-West trade;
- o Western Europe's strategic vulnerability to future oil supply interruptions; and
- o Soviet ability to provide secure long-term supplies of natural gas as an alternative.

They will also be prepared to offer additional gas at prices below those of existing or likely future competitors. [REDACTED]

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Should the West European manufacturers fail to ship the embargoed rotors, Moscow will threaten to:

- o Require penalty payments for nonperformance; and
- o Blacklist firms that fail to deliver equipment, refuse to pay penalty fees, provide no help in procurement of the GTN-25 rotors, or fail to produce the GE-designed rotors in violation of US sanctions.

The Soviets might also reward countries and firms that cooperate in overcoming the US embargo by giving them more gas and equipment contracts. They are much less likely to withhold gas from those countries whose companies fail to comply with contract provisions. [REDACTED]

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For their part, the West Europeans are carefully weighing their position between the superpowers, considering military and

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political strategy as well as economics. They have the following broad options:

- o In spite of threats to the contrary, acquiesce in the US embargo.
- o Comply selectively--ignoring those features of the embargo that they consider illegal, particularly the extraterritorial and retroactive features -- in essence daring the US to take them to court or impose other legal or administrative procedures. This most likely approach would also involve encouragement and offers of legal immunity by governments to those manufacturers that fulfill existing contracts and circumvent the embargo.
- o Circumvent the sanctions entirely--claiming restraint of trade on the part of the US, further subsidizing and encouraging fulfillment of contracts (through the use of US technology if necessary) to produce parts and equipment that would compete directly with US products.

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A number of factors will push both sides toward a West European rather than a Soviet go-it-alone solution to the embargo.

- o The Soviets want West European involvement in the pipeline to encourage gas sales, to obtain Western equipment and technology, and to help drive a wedge between the US and its European partners.

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- o Although reluctant to challenge the US measures directly, the West Europeans--both companies and governments--are even more reluctant to forego several billion dollars in anticipated export earnings and to pay the substantial penalties involved in contract cancellation. [REDACTED]

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In descending order of probability, we think the probable outcomes are:

- o Shipment of the GE rotors already in Western Europe.
- o Production of GE-designed rotors by the French firm Alsthom-Atlantique--both the 40 already on order and an additional number (probably around 60); this would probably require some type of subsidy for the higher priced Alsthom rotor, either by direct-equity financing on the part of the Soviets, Soviet acceptance of higher prices, or a subsidy on the part of the French Government.
- o A Soviet request for Western assistance in manufacturing rotors for the GTN-25 to reduce vulnerability to future embargoes.
- o Soviet redesign of the pipeline or substitution of a combination of smaller turbines or other drivers of either foreign or Soviet design by:
 - substituting domestic turbines where feasible by borrowing "spares" from existing trunklines, and/or

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-- beefing up domestic turbine output and performance for gas transmission use. If smaller Soviet turbines are diverted to fit out the export line, an anticipated shortage of these units will set back the Soviet domestic pipeline program even further. [REDACTED]

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In pursuing strategies to overcome the US embargo, the Soviets will give the highest priority to delivering the full contracted volume of gas on schedule. This can be accomplished by:

- using existing spare pipeline capacity in the Soviet Union and Eastern Europe to ship up to 6 billion m³ beginning in late 1984;
- delivering up to 21 billion m³ beginning in late 1985 through the new export pipeline. If Moscow acquires the 20 or so rotors already in Western Europe plus the 40 spare rotors contracted for from Alsthrom-Atlantique, the entire volume of additional gas could be delivered in 1986. [REDACTED]

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Background

The Soviets and West Europeans are attempting to find ways to circumvent the extended US embargo on equipment for the Siberian natural gas export pipeline. Both sides see fundamental economic and political advantages in expanding trade and view the pipeline as the major East-West commercial venture of the 1980s:

- o For Moscow, the US sanctions pose a political and economic challenge. A substantial delay or cancellation of the project would reduce expected Soviet hard currency earnings, constraining imports of Western goods and technology. The pipeline deal also is almost certainly seen by the Soviets as an important opportunity to increase their influence in Western Europe.
- o The West Europeans see Soviet gas as an important substitute for Middle Eastern oil and view Soviet pipeline equipment orders as easing their substantial unemployment problem. In addition, they hold that increased East-West economic interdependence will lead to more responsible Soviet behavior. They are deeply angry with the US decision, in particular the extraterritorial and retroactive features of the measures, and see the embargo as another example of a US predisposition to interpret unilaterally both international trade practices and the proper approach to East-West relations.

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The Soviets and West Europeans apparently have not yet agreed on a course of action. The West European companies involved will probably not act without guidelines from their governments, which are still considering various legal or technical approaches. Moscow has been strongly pushing the West Europeans to circumvent the December 1981 embargo on GE turbine rotors and now is counting on their resentment over the embargo's extension to spur them to action. [REDACTED]

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Soviet Gas Minister Dinkov's recent meetings with European turbine firms were not entirely successful and the Soviets have been holding new meetings with West European contractors in Moscow this week. The Soviets have continued their hard-line approach involving threats of contract cancellations and impositions of severe penalties against financially shaky firms, but a more cooperative Soviet-West European approach to getting around the sanctions is likely to emerge. [REDACTED]

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This paper first addresses Soviet priorities and likely Soviet strategies for countering the US embargo of critical equipment for the Siberia-to-Western Europe natural gas pipeline. The foreign and domestic equipment options open to the Soviets are then examined, and the reactions and alternative courses of action of West European equipment manufacturers and governments are discussed. [REDACTED]

Soviet Priorities

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Moscow wants the gas export project for several reasons. Most important, the pipeline will earn badly needed hard currency and aid development of the Soviet gas industry. These objectives are increasingly important to the troubled Soviet--and East European--economies. At the same time, the USSR sees the project as a major step toward expanding its commercial and political ties with Western Europe at US expense. [REDACTED]

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Hard Currency Earnings. The pipeline is vital to Moscow's prospects of earning sufficient hard currency beyond the mid-1980s to avoid a major drop in its import capacity. Oil export revenues will probably fall substantially by 1985, and gas exports--under the pipeline deal and existing contracts--will pick up much of the slack. Revenues from the pipeline deal alone should reach \$4.5-6 billion (1981 \$) annually in the early 1990s, when all credits are repaid, and total gas earnings (including existing contracts) could be roughly \$10 billion. The pipeline thus will support Moscow's purchases of Western goods and technology. These imports will be increasingly important to improving industrial productivity and to reducing agricultural shortfalls. The earnings from pipeline gas will also help the Soviets to avoid substantial cuts in economic aid to Eastern Europe beyond those now being made because of the hard currency crunch and their own economic needs. [REDACTED]

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Aid to Gas Production. Moscow is almost certainly counting on the pipeline project to establish a reliable West European

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source of equipment for developing Siberian gas production, the key to Soviet energy plans through 1990. Gas output will provide almost all the growth in Soviet primary energy production and will be an increasingly important source of Soviet energy supplies to Eastern Europe. Western pipeline equipment is critical to meeting plans for rapid gas production growth, however, and the Soviets are seeking to establish secure, non-US sources of supply--particularly for turbines, the technology most vulnerable to US sanctions. Moscow may see the turbine orders for the export pipeline as leading to further contracts, with the West Europeans possibly building a turbine of Soviet design. The Soviets at least expect the current deal to sustain West European business interest in future gas-for-equipment agreements, regardless of the US position. [REDACTED]

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Political Objectives. The Soviets have almost certainly viewed the pipeline project as a means of increasing divisions between Western Europe and the US, and the embargo has enhanced Moscow's ability to pursue that goal. The USSR probably believes that the West Europeans' increased dependence on Soviet gas deliveries by the late 1980s--possibly 25 percent of total West European gas imports--will become a permanent factor in their decision-making on East-West issues. In the past, the Soviets have used the West Europeans' interest in expanding East-West commerce to undercut existing US sanctions, and they believe a successful pipeline deal will reduce future European willingness to support a US disruption of Soviet trade. [REDACTED]

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Soviet Pipeline OptionsProven Domestic Turbines

Shortages of gas turbines and compressor equipment for natural gas pipeline service have limited the expansion of Soviet gas supply since 1965. The problem became especially acute in 1972-1973 with the introduction of 48- and 56-inch diameter linepipe for long-distance trunklines. A high-priority program with Defense Ministry support was begun in about 1974 to upgrade civilian gas turbine technology and boost domestic turbine output for pipeline use. This effort only proved to be only partially successful. The USSR reduced its dependence on imported Western compressors from 30 to 33 percent of total installed capacity in 1976, to about 16 to 20 percent in 1981. Two types of turbine-driven compressors were designed, tested, and mass-produced. About 300 6.3-megawatt (MW) rated GTN-6 aero-derivative turbine compressors were installed with a combined capability 1,900 MW, and 500 or so 10-MW rated GTK-10 industrial turbines were put into operation with a combined rating of 5,000 MW by the end of 1981. Last year these two basic units accounted for about 10 percent and 25 percent, respectively, of total installed compressor capacity in the USSR. The remaining capacity consists of a mix of older mechanical drives, smaller turbines, and electric motors. [REDACTED]

GTK-10 Turbine Compressors. The Soviets refer to this 10-MW turbine as the "workhorse" of the gas industry. Production of this unit is currently estimated at more than 100 units per year. However, turbine output is constrained by a limited supply

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of rotor blades, which has been a chronic problem of the civilian turbine industry. The Leningrad (Nevskiy) turbine plant produced about 85 percent of the GTK-10s last year. Boosting output of the GTK-10s to meet anticipated needs would probably involve some reallocation of turbine blades away from the military to civilian industry and therefore probably would not be the preferred alternative.

The turbine demand implied by the current Five-Year Plan for pipeline compressor station construction for all sizes of gas pipelines far exceeds expected turbine output. About 200 compressor stations were built during 1976-1980, and up to 380 are planned for 1981-1985. We estimate that construction of about 120 stations equipped with roughly 1,000 GTK-10s for the five new, domestic 56-inch diameter pipelines will be required to provide full power operation in 1985. Moreover, fully powering the new domestic pipelines would require a doubling of present turbine output to over 200 per year. It is far more likely that a shortfall in fully equipping domestic lines would occur rather than any Soviet attempt to purchase Western equipment to make up the difference. Turbines for the export line would still have to be imported in the unlikely event that requirements for these large domestic trunklines are met.

Cost. Domestic pipeline plans for 1985 almost surely will not be met due to lack of adequate numbers of turbine-driven compressors. Reduced gas supplies will result from lower line pressures even if all five domestic pipelines are laid. Natural gas deliveries might fall well below the 585 billion m³ we currently estimate for 1985, to less than 550 billion m³, thus

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adding to the problems that the USSR already confronts. It would:

- Curb Soviet ability to substitute gas for oil and coal;
- Intensify competition between sectors of the economy for scarce resources;
- Increase the opportunity cost of gas exports;
- Force the Soviets to import unembargoed compressor equipment at external prices that are about twice the internal cost of similar items;
- Increase compressor station fuel requirements wherever less-efficient turbines are used.

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Options: Domestic or Foreign. Mass production of 120 of the Soviet GTN-25 industrial turbines for the export pipeline could be undertaken as a substitute for the embargoed turbines. Western technical assistance in the production of GTN-25 rotors either in the USSR, or abroad under licensing, could result in shipment of all kits by 1986. Under this scenario, installation and final completion of the export line would probably occur no sooner than the last half of 1986. If design, metallurgical, or fabricating problems arise, final pipeline completion with full power operation might slip to late 1987 or beyond.

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However, if the 20 or so rotor kits already shipped to AEG-Kanis, Nuovo Pignone, and John Brown are delivered to the Soviets in contravention of the US embargo, a combination of GTNs and GE equipment could be used. Likewise, if Alsthom-Atlantique supplies the 40 spare rotor kits now on order, around 60 GE-equipped turbines could be available. Only 60 or so Alsthom-supplied rotors or Soviet GTN-25s would then be needed to complete the export pipeline. Mixing compressor equipment would pose no major problems. A mix of other, smaller non-US turbines could also be substituted to complement GTN-25 output.

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Frame V Substitutes

Possibilities for using equipment other than the Frame V turbine are limited only by the availability of non-US equipment and user preference for industrial rather than aero-derivative turbine-drivers or electric motors.* A delay of one year or so might result from the redesign of compressor stations and extra time to tool up for production of alternative turbine and compressor equipment. On the other hand, any delay could be small if inventories of optional turbines are high, as has been reported for Rolls-Royce. Installation of eight of the smaller, Soviet-made GTK-10 turbines in each compressor station (5 units

* The Soviet gas minister has indicated a strong preference for heavy-duty industrial gas turbines over aero-derivative turbines or electric motor drives. It is likely that superior on-line performance of GE industrial turbines on existing Soviet gas pipelines is responsible for this preference.

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operating on line plus 3 on standby) would deliver the same volume of gas as 3 Frame Vs (2 on line plus 1 on standby) and provide similar 75-atmosphere operating pressures. The smaller units would be less efficient, however, in terms of fuel consumption and maintenance. On 56-inch diameter pipelines, the use of fewer turbines and lower operating pressures (55-65 atmospheres) are also feasible options, although this practice would reduce throughput by 15-30 percent.

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The GTK-10 has been operating successfully on several major gas trunklines in the Soviet Union within a range of 55-75 atmospheres: Central Asia-Urals, Central Asia-Center, Urengoy-Chelyabinsk, and "Northern Lights." However, production of up to 1,200 units of this model to equip all five domestic pipelines by 1986, much less 325 additional turbines to complete the export pipeline by October 1984, is almost certainly an unrealistic goal. Nevertheless, ordering combinations of other non-US Western turbines or other drivers with a combined rating of 3,000 MW to fully power the export line is feasible. Potential substitutes for the export line are shown in Table 1.

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Table 1

Manufacturer	Country	Model	MW Rating	Type	Number of Units Needed to Power Export Pipeline
Hispano-Suiza	France	TLHMK-1304	8.1	Aero-derivative turbine	371
Sulzer Bros.	Switzerland	7/S7	10.6	Heavy-duty industrial/aero-derivative turbine	283
Stal-Laval	Sweden	GT-35	12.6	Heavy-duty industrial turbine	239
Mitsubishi	Japan	SB-90C	15.4	Heavy-duty industrial turbine	188
Siemens	West Germany		16.0	Electric motor	
Brown Boveri	Switzerland		16.0	Electric motor	188
GEC	United Kingdom	ELM-125/ERB-124	19.6-22.6	Heavy-duty industrial or aero-derivative turbine	134-154
Rolls Royce	United Kingdom	RB211	22.0	Aero-derivative turbine	137
Sulzer/Rolls Royce	Switzerland/ United Kingdom	RB211	21.0	Aero-derivative turbine	143
Fiat	Italy		25.0	Heavy-duty industrial turbine	120

This table is unclassified.

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Frame V Embargo Circumvention

Soviet efforts to circumvent the present US embargo are a foregone conclusion. Prior to the US relaxation of COCOM controls on petroleum equipment in April 1972, diversions of drilling rig assemblies, drill pipe, drill bits, christmas trees and wellheads, geophysical and gas-lift equipment were documented. Anything short of acquisition of the 20 or so rotors already delivered by GE to the West European turbine manufacturers plus the 40 spare rotors to be manufactured by Alsthom Atlantique would be viewed as a policy failure from the Soviet standpoint. Final disposition of the rotors will determine the winner and loser in this political tug of war. They undoubtedly feel that if the European contractors can be persuaded to deliver the rotors, then additional US high-technology petroleum equipment produced offshore will pour forth. In the short run, many US equipment patents already have, or soon will expire. The economic advantage to be gained from copying and producing US equipment and taking over US markets will not be ignored in Western Europe and Japan. In fact, this form of competition is already encouraged and in many cases subsidized by governments with investment capital and concessionary financing for export sales. [REDACTED]

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Foreign governments and firms will be reluctant to disturb historic trade relationships, but if corporate survival and national interests conflict sharply enough with US policy, the

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legality of the US sanctions may be challenged in unfriendly foreign courts. If business and economic conditions get much worse for the European pipeline contractors, the flood gates holding back US equipment will be opened much sooner. []

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A summary of Soviet technical options is shown in Table 2. Each option is shown with our estimate of the likely cost and risk to the Soviets as well as a judgment of the likelihood the option will be pursued. An estimate of the delay in completion of the export pipeline beyond the originally scheduled date of late 1984 is also shown for each option. These alternatives to counter the US embargo are not mutually exclusive. The Soviets are likely to pursue several options at once. Whatever strategy the Soviets pursue with or without West European cooperation--the additional gas for which the West Europeans have contracted will likely begin to be delivered on time through excess capacity in the existing pipeline system. Only later, as gas volumes build up to full contract levels, will the selection of options become relevant. []

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West European Attitudes and Options

The Manufacturers

AEG-Kanis. Of the West European firms with pipeline turbine contracts, the West German company is in the worst financial condition. With a \$250 million contract to supply 47 turbines, AEG-Kanis claims publicly that the sanctions will threaten its existence. It has 2,900 employees and about \$130 million in

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Table 2

Soviet Technical Options to Counter the US Embargo*

Option	Cost to Soviets	Risk to Soviets	Probability of Realization	Delay to Pipeline**	Remarks
A. Use of 20 or so GE-manufactured rotor sets already in Europe for 25-MW Frame V turbines and 40 Alsthom-Atlantique (AA) spare rotors for 25-MW Frame V turbines	Low	Low	High	1-2 years	legality uncertain
B. Use of AA-manufactured rotors for balance required for 25-MW Frame V turbines	Low-Moderate	Low	Moderate-High	2-3 years	violation of US embargo
C. Use of other West European-manufactured rotors ("reverse engineering") for 25-MW Frame V turbines	Low-Moderate	Moderate	Moderate	1-3 years	possible compatability problems; relations with GE could be damaged
D. Use of rotors built to Soviet specifications in Soviet GTN-25 turbines	Low-Moderate	Moderate-High	Moderate-High	2-3 years	Soviet turbines not yet in serial production
E. Use of smaller, Soviet-built gas turbines (10-MW)	Moderate-High	Low-Moderate	Moderate-High	0-2 years	could impede domestic pipeline completion
F. Use of smaller, West European-manufactured gas turbines	Moderate-High	Low-Moderate	Low-Moderate	1-3 years	availability a question
G. Use of large electric motors (12- to 16-MW) on portions of pipeline	Moderate-High	Moderate	Low	1-2 years	new power lines needed; reduced electricity supply to other users
H. Accelerated development of all-Soviet 25-MW turbine	High	High	Low	3-4 years	cost of self-sufficiency may be too great

*NOTE: More than one of these options is likely to be pursued simultaneously.

**Beyond the Soviet-scheduled completion date of late 1984.

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annual sales and is a wholly owned subsidiary of the AEG-Telefunken conglomerate. The parent company is virtually bankrupt now and cannot survive in its present form, with or without the pipeline contract. Although it is West Germany's eighth largest employer (with 108,000 workers), AEG has been on a downhill path since the late 1960s. Its stock price has plunged 96 percent since then and only massive bank aid has kept it afloat during the last three years. [REDACTED]

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During 1979-1981, the parent firm lost close to \$800 million, and a deficit of \$225 million is projected for this year. Loss of the gas turbine contract apparently would add only about \$40 million to this figure. AEG's directors are currently trying frantically to arrange a complicated restructuring plan to avert bankruptcy. The plan calls for major sacrifices by the banks, a bail-out of the company's pension fund, the closing of some facilities and the selling of others, a huge injection of foreign capital, and both state and federal government loan guarantees. The sanctions issue probably increases the chances that Bonn will violate its free-market principles and participate in the rescue effort. [REDACTED]

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The Governments

West Germany. The negative reaction in West Germany to expanded US sanctions is being sounded in generally similar terms by government, opposition, business, labor unions, and the press. Frequently heard themes are that the sanctions:

- May delay but will not stop the pipeline;
- Violate the Versailles agreements;
- Come as a complete surprise;
- Are probably illegal;
- Will impede future ventures with US firms; and
- Will cost from 1,200 to 2,000 jobs in West Germany.

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Chancellor Schmidt has emphasized his surprise at the extension, saying it was not mentioned at Versailles. He also has cited with approval the EC Foreign Ministers' criticism of the action.

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The Economics Ministry has hinted that Bonn will opt for shipment of the turbines on schedule.

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Italy. After some hesitation, Rome finally joined its European partners in condemning the US action. On 29 June, Italy informed the US that it rejects the doctrine of extraterritoriality and retroactive controls affecting existing contracts and that it considers as no longer binding a January NATO commitment not to undermine each other's sanctions. Rome, nevertheless, still maintains its "pause for reflection" in negotiations with the Soviets on natural gas purchases. [REDACTED]

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United Kingdom. Britain strongly opposes what it sees as questionable extraterritorial and retroactive application of US law. Prime Minister Thatcher has described the US decision in Parliament as "wrong and ultimately harmful to US interests." London has said that it will not accept the extension of US jurisdiction and will use whatever countermeasures are available including trade restrictions on US firms. Although insisting it does not want a confrontation and stopping short of ordering British companies not to comply with US directives, London activated existing legislation that directly allows it to block applicability of US trade regulations in Britain. [REDACTED]

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If GE does not supply the rotors, French Government officials have stated that they will have the choice between directing Alsthom to go ahead--after obtaining further legal clarification--or pursuing other options such as joint projects with the Soviets to develop separate technology or revival of the alternate European projects that had been advanced earlier but rejected by the Soviets in favor of GE. Paris is capable of doing both and could exert pressure on Alsthom to produce the

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